

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

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In re Application of:	:	Examiner: Trevor E. McGraw
	:	
Manfred ROESSLER et al.	:	
	:	
For: FUEL INJECTION VALVE	:	
	:	Art Unit: 3752
Filed: April 14, 2005	:	
	:	
Serial No.: 10/531,407	:	
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Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office via the Office electronic filing system on **November 25, 2008**.

Signature: /Wendy Espinal/
Wendy Espinal

APPEAL BRIEF TRANSMITTAL

SIR:

Transmitted herewith for filing in the above-identified patent application, please find an Appeal Brief pursuant to 37 C.F.R. § 41.37. A two-month period to respond to the Notice of Appeal of July 25, 2008 expired on September 25, 2008. Applicants hereby petition for a two-month extension of time for submitting the Appeal Brief. The extended period for submitting the Appeal Brief expires on November 25, 2008.

The **\$1,030.00 fee** (\$540 Appeal Brief fee and \$490 extension of time fee) is being **paid by credit card**.

The Commissioner is also authorized to charge payment of any additional fees or to credit any overpayment, to the Deposit Account of Kenyon & Kenyon LLP, Deposit Account No. **11-0600**.

Respectfully submitted,

Dated: November 25, 2008

By: /Clifford A. Ulrich/
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Signature: /Wendy Espinal/
 Wendy Espinal

APPEAL BRIEF PURSUANT TO 37 C.F.R. § 41.37

SIR:

On July 21, 2008, Appellants submitted a Notice of Appeal from the last decision of the Examiner contained in the Final Office Action dated March 19, 2008 in the above-identified patent application. The Notice of Appeal is believed to have been received by the United States Patent and Trademark Office on July 25, 2008.

In accordance with 37 C.F.R. § 41.37, this brief is submitted in support of the appeal of the rejection of claim 7. For at least the reasons set forth below, the final rejection of claim 7 should be reversed.

1. REAL PARTY IN INTEREST

The real party in interest in the present appeal is ROBERT BOSCH GMBH of Stuttgart in the Federal Republic of Germany, which is the assignee of the entire right, title and interest in and to the present application.

2. RELATED APPEALS AND INTERFERENCES

There are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to

Appellants or the assignee, ROBERT BOSCH GMBH, “which may be related to, directly affect or be directly affected by or have a bearing on the Board’s decision in the pending appeal.”

3. STATUS OF CLAIMS

Claims 1 to 6 and 8 to 12 have been canceled.

Claim 7 is pending.

Claim 7 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of U.S. Patent No. 4,245,789 (“Gray”) and U.S. Patent No. 5,732,888 (“Maier et al.”).

A copy of the appealed claim, *i.e.*, claim 7, is attached hereto in the Claims Appendix.

4. STATUS OF AMENDMENTS

In response to the Final Office Action dated March 19, 2008, Appellants submitted a “Reply Under 37 C.F.R. § 1.116” on June 18, 2008. The Reply Under 37 C.F.R. § 1.116 did not include any proposed amendments to the claims. It is noted, however, that the Advisory Action dated July 8, 2008 indicates that “the proposed amendment(s) . . . will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended,” despite the fact that no proposed amendments to the claims were included in the Reply Under 37 C.F.R. § 1.116. It is Appellants’ understanding that the claims as included in the annexed “Claims Appendix” reflect the current claims.

5. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 7 relates to a fuel injector for a fuel injection system of an internal combustion engine. Claim 7 recites that the fuel injector includes a solenoid coil 10. *Specification* at page 2, line 34 to page 3, line 1. Claim 7 recites that the fuel injector includes an armature 20 acted upon in a closing direction by a restoring spring 23. *Specification* at page 3, lines 26 to 28. Claim 7 recites that the fuel injector includes a valve needle 3, which is connected to the armature 20 by force-locking and at which a valve-closure member 4 is formed, which forms a sealing seat together with a valve-needle surface 6. *Specification* at page 2, lines 30 to 33 and page 3, lines 10 to 12. Claim 7 recites that the armature 20 faces and strikes against a stop face 39 of an inner pole of the solenoid coil by way of an armature stop face 38. *Specification* at page 4, lines 29 to 32. Claim 7

recites that both the armature stop face 38 and the stop face 39 of the inner pole have the same coating 40. *Specification* at page 5, lines 12 to 13. Claim 7 recites that the coating 40 is deposited on the armature stop face 38 and on the stop face 39 of the inner pole in a plurality of chromium layers, the coating having a surface structure with raised areas 42 and recessed areas 43, wherein the raised areas have a dome-shaped design. *Specification* at page 4, lines 23 to 27 and page 5, lines 12 to 13. Claim 7 recites that the height difference between the raised areas and recessed areas is initially between 5 μm and 10 μm and is reduced to between 4 μm and 5 μm during use of the fuel injector. *Specification* at page 5, lines 1 to 9.

6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Whether claim 7 is patentable under 35 U.S.C. § 103(a) over the combination of Gray and Maier et al.

7. ARGUMENT

Claim 7 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Gray and Maier et al. It is respectfully submitted that the present rejection should be reversed for at least the following reasons.

Claim 7 relates to fuel injector for a fuel injection system of an internal combustion engine. Claim 7 recites that the fuel injector includes a solenoid coil, an armature acted upon in a closing direction by a restoring spring, and a valve needle, which is connected to the armature by force-locking and at which a valve-closure member is formed. Claim 7 recites that the valve closure member forms a sealing seat together with a valve-needle surface, the armature facing and striking against a stop face of an inner pole of the solenoid coil by way of an armature stop face. Claim 7 recites that both the armature stop face and the stop face of the inner pole have the same coating. Claim 7 recites that the coating is deposited on the armature stop face and on the stop face of the inner pole in a plurality of chromium layers, the coating having a surface structure with raised areas and recessed areas, wherein the raised areas have a dome-shaped design and the height difference between the raised areas and recessed areas is initially between 5 μm and 10 μm and is reduced to between 4 μm and 5 μm during use of the fuel injector.

Coating both the armature stop face and the stop face of the inner pole provides improvement over simply coating only one or the other of the stop faces. Particularly, apart from protecting both surfaces against wear and improving the flow-off of the fuel when the armature is pulled up in response to an energizing of the solenoid coil, this

feature reduces the cavitation of the armature stop face as well as the stop face of the inner pole.

Gray discloses an electromagnetic fuel injector and teaches providing the softer one of opposed working air gap surfaces of a pole piece 62 and an armature 73 of an injector solenoid assembly with an average surface roughness rating value on the order of 16 to 32 micro-inches. *See, e.g.*, Abstract and col. 8, lines 42 to 62. Moreover, Gray discloses a non-magnetic, case-hardened shim 78 that is positioned between a core 63 of the pole piece so that the stop face of the inner pole and the stop face of the armature do not directly face each other, in contrast to the structure defined in claim 7. It is further noted that Gray does not teach or suggest applying a coating, but rather teaches grinding and subsequent lapping of a respective surface to achieve a surface roughness. *See, e.g.*, col. 9, lines 16 to 35 and In this regard, it is readily apparent that Gray fails to disclose or suggest an armature stop face and a stop face of an inner pole that have the same coating.

Maier et al. relates to an electromagnetically operable valve. Maier et al. discloses a core 2 that impacts with an armature 27. *See, e.g.*, col. 5, lines 25 to 34. At column 4, lines 1 to 4, Maier et al. recites that “[t]he application of metallic coatings 65, for example of chromium or nickel coatings, to the core end 9 of the core 2 and to the armature 27, by galvanization methods, is already known.” Maier et al. continue, however to recite that “[t]he coating thickness of these coatings 65 generally measures between 10 and 25 μm .” Col. 4, lines 11 to 12. In contrast to the teaching of Maier et al., claim 7 provides for a **plurality of chromium layers that are applied to both armature stop face and the stop face of the inner pole which measure initially between 5 μm and 10 μm and which -- in their stable state -- are reduced to 4 μm and 5 μm** , which height then is maintained during further use, rather than being further reduced. It is plainly apparent that Grey and Maier et al. -- **alone or in combination** -- do not disclose, or even suggest this feature.

Moreover, with respect to Maier et al., it is noted that Maier et al. discloses a coating that has a wedged structure instead of a dome-shaped structure. At column 4, lines 19 to 24, Maier et al. state that “[d]uring the galvanic coating, there develops at the edges of the parts to be coated, in this case the core 2 and armature 27, a field line concentration, which results in the development of a wedged coating thickness distribution as indicated in FIG. 2.” Maier et al. further explain that “[t]he applied wedged coating 65, when the injection valve is running, is only therefore, subjected to load in a small region. In continuous running, however, a defined impact face is no longer present, since parts of the coating 65 are worn away as a result of several million impacts, so that the impact face grows

increasingly large and hence the wedging is constantly being further reduced.” Col. 4, lines 23 to 30. Thus, it is evident that one of ordinary skill in the art would not have considered the use of such a galvanic coating process as described in Maier et al. In this regard, neither the dome-shaped structure made up of several layers of coating nor the height difference of 5 μ m to 10 μ m are disclosed, or even suggested, by Maier et al., such that these features are not disclosed or suggested by the combination of Gray and Maier et al.

In view of the foregoing, it is plainly apparent that the combination of Gray and Maier et al. fails to disclose, or even suggest, all of the features set forth in claim 7. Accordingly, it is plainly apparent that the combination of Gray and Maier et al. fails to render unpatentable claims 13 and 18. That is, the Final Office Action and/or the Advisory do not establish a *prima facie* case of obviousness consistent with the Supreme Court’s decision in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, 82 U.S.P.Q.2d 1385 (2007).

It is further noted that neither the Final Office Action nor the Advisory Action addresses the feature of a plurality of chromium layers applied to both the armature stop face and the stop face of the inner pole, as recited in claim 7. As shown in Figures 2A and 2B, it is this deposition of a plurality of layers that forms the dome-shaped surface-structure. In this regard, there is no apparent reason why one of ordinary skill in the art at the time of the invention would apply a plurality of chromium layers to the working gap surfaces of Gray, which discloses surface features formed by a grinding operation. *See, e.g.*, col. 9, lines 16 to 35. Accordingly, there is no apparent rationale in accordance with *KSR International Co.* that would support a finding that this feature is obvious. Thus, the Final Office Action and/or the Advisory Action do not establish a *prima facie* case of obviousness for at least this additional reason.

Further, as regards the allegation set forth in the Final Office Action, and maintained in the Advisory Action, that there would have been a motivation to combine and/or modify Gray and Maier, it is apparent that one of ordinary skill in the art at the time of the invention would have no reason or motivation to apply the same coating to both of the working air gap surfaces of Gray. The surface features of Gray are provided in an attempt to reduce stiction and adhesion. *See, e.g.*, col. 8, lines 20 to 26. Thus, even assuming, *arguendo*, that there is some motivation to apply a coating to both surfaces, there would be no reason or motivation whatsoever to provide the same coating to both of the surfaces, as the coatings would provide surfaces of the same material. Accordingly, there is no apparent rationale in accordance with *KSR International Co.* that would support a finding that this

feature is obvious. Thus, the Final Office Action and/or the Advisory do not establish a *prima facie* case of obviousness for at least this additional reason.

In view of all of the foregoing, reversal of the present rejection is respectfully requested.

8. CLAIMS APPENDIX

A “Claims Appendix” is attached hereto and appears on the page numbered “Claims Appendix.”

9. EVIDENCE APPENDIX

No evidence has been submitted pursuant to 37 C.F.R. §§ 1.130, 1.131 or 1.132. No other evidence has been entered by the Examiner or relied upon by Appellants in the appeal. An “Evidence Appendix” is nevertheless attached hereto and appears on the one (1) page numbered “Evidence Appendix.”

10. RELATED PROCEEDINGS APPENDIX

As indicated above in Section 2, above, “[t]here are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to Appellants or the assignee, ROBERT BOSCH GMBH, ‘which may be related to, directly affect or be directly affected by or have a bearing on the Board’s decision in the pending appeal.’” As such, there no “decisions rendered by a court or the Board in any proceeding identified pursuant to [37 C.F.R. § 41.37(c)(1)(ii)]” to be submitted. A “Related Proceedings Appendix” is nevertheless attached hereto and appears on the one (1) page numbered “Related Proceedings Appendix.”

11. CONCLUSION

For at least the reasons indicated above, Appellants respectfully submit that the art of record does not disclose or suggest the subject matter as recited in the claims of the above-identified application. Accordingly, it is respectfully submitted that the subject matter as set forth in the claims of the present application is patentable.

In view of all of the foregoing, reversal of all of the rejections set forth in the Final Office Action is therefore respectfully requested.

Respectfully submitted,

Dated: November 25, 2008

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CLAIMS APPENDIX

7. A fuel injector for a fuel injection system of an internal combustion engine, comprising:

a solenoid coil;

an armature acted upon in a closing direction by a restoring spring; and

a valve needle, which is connected to the armature by force-locking and at which a valve-closure member is formed, which forms a sealing seat together with a valve-needle surface, the armature facing and striking against a stop face of an inner pole of the solenoid coil by way of an armature stop face,

wherein both the armature stop face and the stop face of the inner pole have the same coating,

the coating being deposited on the armature stop face and on the stop face of the inner pole in a plurality of chromium layers, the coating having a surface structure with raised areas and recessed areas, wherein the raised areas have a dome-shaped design and the height difference between the raised areas and recessed areas is initially between 5 μm and 10 μm and is reduced to between 4 μm and 5 μm during use of the fuel injector.

EVIDENCE APPENDIX

No evidence has been submitted pursuant to 37 C.F.R. §§1.130, 1.131, or 1.132. No other evidence has been entered by the Examiner or relied upon by Appellants in the appeal.

RELATED PROCEEDINGS APPENDIX

As indicated above in Section 2 of this Appeal Brief, “[t]here are no other prior or pending appeals, interferences or judicial proceedings known by the undersigned, or believed by the undersigned to be known to Appellants or the assignee, ROBERT BOSCH GMBH, ‘which may be related to, directly affect or be directly affected by or have a bearing on the Board’s decision in the pending appeal.’” As such, there no “decisions rendered by a court or the Board in any proceeding identified pursuant to [37 C.F.R. § 41.37(c)(1)(ii)]” to be submitted.